ABSTRACT

A dispersing Fourier Transform interferometer (DFTS) includes a Fourier Transform Spectrometer having an input for receiving a source light and an output, and a dispersive element having an input coupled to the Fourier Transform Spectrometer output and an output for providing the resulting multiple narrowband interferogram outputs of different wavelengths representative of the source light input. A processor applies a sparse sampling algorithm for determining the best fit between a set of model interferograms and the set of data interferograms. The model interferogram is inferred as specified at a discrete set of lags, a difference is determined between the model interferogram and the data interferogram, and an optimization method determines the model interferogram best matched to the data interferogram. The DFTS interferometer improves the sensitivity of a standard FTS by including a dispersive element, increasing the SNR by a factor of $(R_g)^{1/2}$ as compared to the FTS, where R_g is the resolving power of the conventional dispersing spectrometer (i.e. $R_g = \lambda/\Delta\lambda$).